

What is claimed is:

1. A method of preparing a bioactive ceramic-coated composite, the method comprising:

coating calcium phosphate-based ceramic on a ceramic substrate; and

thermally treating the coated calcium phosphate-based ceramic layer while supplying water vapor.

2. The method according to claim 1, wherein the ceramic substrate is formed of at least one material selected from the group consisting of zirconia, alumina, and titania.

3. The method according to claim 1, wherein the coated layer has a thickness of about 0.1  $\mu\text{m}$  to 1 mm.

4. The method according to claim 1, wherein the calcium phosphate-based ceramic layer is formed of at least one material selected from the group consisting of hydroxyapatite, fluoroapatite, tricalcium phosphate, tetracalcium phosphate, calcium phosphate, and tetracalcium hexaphosphate.

5. The method according to claim 1, wherein the coating of the calcium phosphate-based ceramic layer is performed using at least one selected from the group consisting of a dipping process, a doctor blade process, a physical vapor deposition (PVD) process, a chemical vapor deposition (CVD) process, and a biomimetic coating process.

6. The method according to claim 1, wherein the thermally treating of the coated layer is performed at a temperature of about 800 to 1800 °C.

7. The method according to claim 1, wherein the supplying of the water vapor is performed under a partial pressure of  $10^{-4}$  to 1 atmospheric pressure.

8. The method according to claim 1, wherein the supplying of the water vapor comprises incorporating at least one gas selected from the group consisting of

oxygen (O<sub>2</sub>), nitrogen (N<sub>2</sub>), and argon (Ar) into water and flowing the gas above the coated layer.

9. The method according to claim 1, wherein the supplying of the water vapor comprises supplying the water vapor generated by boiling water to the coated layer.
- 5